

REMARKS

Reconsideration and allowance of the above-identified application are respectfully requested.

Claims 1-76 are pending, wherein claims 1, 28, 36, 63, 66, 69, 72 and 75 are independent.

Applicants note with appreciation the acknowledgement of the Information Disclosure Statements filed in September 2001, July 2003, and August 2004.

Applicants respectfully request that the attorney docket number associated with the above-identified application be changed from "M-12004 US" to "215248.00004".

In the third section of the Office Action, claims 1-35, 66-68 and 72-76 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Heismann et al. ("Electro-Optically Tunable, Narrowband Ti:LiNbO₃ Wavelength Filter," Electronic Letters, May 21, 1987, hereinafter "Heismann"). This rejection is respectfully traversed.

According to exemplary embodiments of the present invention, an electric field that changes across a distance in space is synthesized, by applying at several locations voltage levels that are independent of one another. According to exemplary embodiments, two or more voltage levels can be applied at a number of locations successively one after another along a predetermined direction, thereby to synthesize an electric field that changes along the predetermined direction. Application of voltage levels independent of one another at non-adjacent locations allows an electric field that is synthesized to be made periodic or aperiodic. The voltage levels can be oversampled, although the voltage levels need not be oversampled if, for example, the to-be-synthesized electric field is aperiodic. According to exemplary

embodiments, a number of electrodes or locations in space that are adjacent to one another can carry the same voltage level. Thus, a plurality of electrodes or other locations in space can be grouped together to form a plurality of groups. The electrodes or locations *within a group* can be *electrically connected together*, while each of the groups can be *electrically insulated from each other*. Voltage levels can then be applied to *each* of the plurality of groups to synthesize the electric field.

Heismann discloses a tunable optical transmission filter. The filter is based on wavelength-dependent polarization conversion in a birefringent waveguide and employs a periodic electrode structure with interleaved birefringence tuning electrodes. [see Heismann, page 572] According to Heismann,

[e]lectro-optic tuning of the filter can be accomplished by inducing a spatially uniform electrical field E_z in the waveguide that tunes the birefringence . . . via the electro-optic coefficients . . . In the present device, however, the two fields [(i.e., E_x and E_z)] are applied alternately over a large number of short section to avoid undesired interference between E_x and E_z . Here, short section of uniform birefringence tuning electrodes (BITE) are periodically interleaved between short section of the electrode grating for $TE \leftrightarrow TM$ mode coupling. [Heismann, page 573, bottom of left hand column]

In particular, the entire electrode structure consists of N identical pairs of birefringence tuning and mode coupling sections. [see Heismann, page 573, bottom of left hand column to top of right hand column] According to Heismann, a common tuning voltage V_T is applied to *all* birefringence tuning sections, and a common-mode converter voltage V_{MC} is applied to *all* mode coupling sections. [Heismann, page 573, top of right hand column]

Furthermore, as illustrated in Figure 2 of Heismann, “[t]he electrodes are arranged in such a way that *no* crossconnections within the electrode structure are required.” [Heismann, page 573, bottom of right hand column (emphasis added)]

Initially, it is respectfully submitted that Heismann does not disclose the step of *oversampling a representation of the electric field to be synthesized*, to determine a plurality of voltage levels to be generated at a corresponding plurality of groups of locations in space, as recited in, for example, independent claims 1 of the present application. Independent claims 28 and 36 recite a similar step or feature. It is respectfully noted that *nowhere* in the present Office Action does the Patent Office cite, point out or otherwise specify where Heismann allegedly discloses such a step or feature. Rather, the Office Action is *silent* as to where Heismann discloses such a step or feature. It is respectfully submitted that Heismann does not disclose such a step or feature, and, therefore, does not anticipate the subject matter of the aforementioned claims.

If this rejection is repeated, the Patent Office is requested to cite or otherwise point out where Heismann discloses such a step or feature.

Furthermore, it is respectfully submitted that Heismann does not disclose the feature of a plurality of groups of locations in space, in which locations *within a group* are *electrically connected* to each other. According to Heismann, an electrode pair consists of a birefringence tuning section and a mode coupling section. However, each section in each pair is *not* electrically connected to the corresponding other section. As noted previously, Heismann discloses that “[t]he electrodes are arranged in such a way that *no* crossconnections within the electrode structure are required.” [Heismann, page 573, bottom of right hand column (emphasis added)] Rather, each section in each pair is electrically connected to a separate common voltage, i.e., each birefringence tuning section is electrically connected to common tuning voltage V_T and each mode coupling section is electrically connected to

common-mode converter voltage V_{MC} . In other words, each birefringence tuning section in each electrode pair is electrically connected to all other birefringence tuning sections in all other electrode pairs, and each mode coupling section in each electrode pair is electrically connected to all other mode coupling sections in all other electrode pairs. Thus, in complete contrast to the present invention, the birefringence section in an electrode pair is not electrically connected to the corresponding mode coupling section in the electrode pair.

In addition, each electrode pair disclosed by Heismann is *not* electrically insulated from all other electrode pairs. Rather, the common tuning voltage V_T is applied to *all* birefringence tuning sections, and the common-mode converter voltage V_{MC} is applied to *all* mode coupling sections. In other words, each birefringence tuning section within each electrode pair is electrically *connected* to all other birefringence tuning sections in all other electrode pairs, and each mode coupling section within each electrode pair is electrically connected to all other mode coupling sections in all other electrode pairs. Consequently, each electrode pair is electrically *connected* to all other electrode pairs. In complete contrast to the present invention, Heismann does not disclose the feature of a plurality of groups of locations in space, in which *each group* of locations is electrically *insulated* from *all other groups* of locations.

Therefore, it is respectfully submitted that Heismann does not disclose the feature of a plurality groups of locations in space, wherein locations *within* a group are electrically *connected* to each other, and wherein *each group* of locations is electrically *insulated* from all other groups of locations, as recited in, for example, claim 1 of the present application.

Additionally, it is respectfully submitted that Heismann does not disclose that a plurality of voltage levels are applied at a corresponding plurality of *groups* of locations, as recited in, for example, claim 1 of the present application. According to Heismann, the common tuning voltage V_T is applied to *all* birefringence tuning sections, and the common-mode converter voltage V_{MC} is applied to *all* mode coupling sections. Thus, separate voltage levels are applied to each section *within* each pair of electrodes, in complete contrast to the present invention. According to exemplary embodiments of the present invention, a voltage level is applied to each *group*. It is respectfully submitted that the Patent Office is fundamentally misunderstanding and misinterpreting the Applicants' invention. It is respectfully submitted that Heismann discloses a structure that is *fundamentally different* than that recited in the claims of the present application.

As Heismann does not disclose numerous features recited in the claims of the present application, it is respectfully submitted that Heismann does not anticipate the subject matter of, for example, claim 1 of the present application.

Independent claims 28, 66, 72 and 75 recite steps or features similar to those discussed above with regard to claim 1, and are, therefore, patentably distinguishable over Heismann for at least those reasons stated above with regard to claim 1.

For example, as recited in independent claim 28 of the present application, the voltage levels at successive adjacent and non-adjacent groups of locations are applied *independently* of one another. Heismann does *not* disclose such *independent* application of voltage levels to successive adjacent and non-adjacent *groups* of locations. Rather, according to Heismann, the common tuning voltage V_T is applied to *all* birefringence tuning sections within each pair

of electrodes, and the common-mode converter voltage V_{MC} is applied to *all* mode coupling sections within each pair of electrodes. Thus, separate voltage levels are applied to each section *within* each pair of electrodes and the *same* voltage levels are applied to each of the corresponding sections in *all* of the pairs of electrodes, in complete contrast to the present invention.

Dependent claims 2-27, 29-35, 67, 68, 73, 74 and 76 variously depend from claims 1, 28, 66, 72 and 75, and are, therefore, patentably distinguishable over Heismann for at least those reasons stated above with regard to claims 1, 28, 66, 72 and 75.

For at least the foregoing reasons, therefore, it is respectfully submitted that Heismann does not anticipate the subject matter of claims 1-35, 66-68 and 72-76. Accordingly, reconsideration and withdrawal of these grounds of rejection are respectfully requested.

In the fifth section of the Office Action, claims 36-65 and 69-71 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Heismann. This rejection is respectfully traversed.

Independent claims 36, 63 and 69 recite steps or features similar to those discussed above with regard to claims 1, 28, 66, 72 and 75, and are, therefore, patentably distinguishable over Heismann for at least those reasons stated above with regard to claims 1, 28, 66, 72 and 75.

The Patent Office asserts that “[i]t would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate into Heismann et al the digital storage elements, since it has been held that broadly providing a mechanical or automatic means to replace manual activity which has accomplished the same result involves

only routine skill in the art.” [Office Action, page 3, citing *In re Venner*, 120 U.S.P.Q. 193 (C.C.P.A. 1958)] It is respectfully submitted that such a basis for an obviousness rejection of the claims of the present application is wholly and completely improper and without basis or support in established patent laws and regulations.

In *In re Venner*, the Appellant argued that claims to a permanent mold casting apparatus for molding trunk pistons were allowable over the prior art, because the claimed invention combined “old permanent-mold structures together with a timer and solenoid which automatically actuates the known pressure valve system to release the inner core after a predetermined time has elapsed.” [*In re Venner*, 120 U.S.P.Q. 193, 194 (C.C.P.A. 1958)] The court held that broadly providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art.

It is respectfully submitted that no such analogous situation exists with respect to the present invention. As discussed previously, the prior art, including Heismann, does not disclose or suggest a method and apparatus for synthesizing an electric field, including the features of a plurality groups of locations in space, wherein locations within a group are electrically connected to each other, and wherein each group of locations is electrically insulated from all other groups of locations, as recited in, for example, claim 1 of the present application. Additionally, it is respectfully submitted that the prior art, including Heismann, does not disclose or suggest an apparatus and method capable of synthesizing an electric field during operation, including the features of a plurality of groups of electrodes positioned successively one after another along a predetermined direction in space, wherein electrodes within a group are electrically connected to each other, each group of electrodes being

electrically insulated from all other groups of electrodes in said plurality, and wherein each group of electrodes in the plurality of groups of electrodes is coupled to a different storage element in a plurality of storage elements, as recited in, for example, independent claim 36 of the present application.

As discussed previously, it is respectfully submitted that the steps, features and structure of the present invention are *different* than the prior art, particularly Heismann. To analogize such a situation to merely replacing a manual activity with an automatic or mechanical means evinces a fundamental misunderstanding, misinterpretation, misconstruction and misapplication of the court's holding in *In re Veneer*.

Additionally, Applicants are at a loss to discern what "manual activity" corresponds to a "digital storage element" to which the Patent Office refers. As is known to skilled artisans, a "digital storage element" is an area allocated from an electrical or electronic hardware component, such as an area of computer memory, bits of a computer register or the like, that is capable of storing information. How providing a "digital storage element" could be considered merely "a mechanical or automatic means to replace a manual activity" evinces a fundamental misunderstanding and misinterpretation by the Patent Office of the features of the claims of the present application, the underlying technology of the present invention, and the holding of the court in *In re Veneer*. Consequently, it is respectfully submitted that the present rejection is wholly and completely improper.

It is respectfully submitted that the Patent Office has provided absolutely no basis in factual, legal and/or technical reasoning, absolutely no intrinsic or extrinsic evidence, and absolutely no support for its bald and unfounded assertion that providing a "digital storage

element" can be considered merely "a mechanical or automatic means to replace a manual activity". Such a blatantly bald and unfounded assertion is contrary to the tenets of established patent laws and to the court's holding in *In re Veneer*, and is, therefore, thoroughly improper. It is respectfully submitted that there is no suggestion, disclosure or teaching in Heismann or otherwise to support the Patent Office's assertion.

Applicants respectfully traverse the Patent Office's assertion. If this rejection is repeated, the Patent Office is requested to specifically point out how providing a "digital storage element" can be considered merely "a mechanical or automatic means to replace a manual activity." The Patent Office is requested to provide a reference or cite a document that supports its assertion, so that the Applicants have a full and fair opportunity to respond to the combination of documents.

According to M.P.E.P. § 2143, to establish a prima facie case of obviousness, three basic criteria must be met. "First, there *must* be some *suggestion* or *motivation*, *either in the references themselves or in the knowledge generally available to one of ordinary skill in the art*, to modify the reference or to combine reference teachings." [M.P.E.P. § 2143 (emphasis added)] In other words, "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention *where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art*." [M.P.E.P. § 2143.01 (emphasis added)] It is respectfully submitted that there is no teaching, suggestion or motivation, either explicitly or implicitly, to modify Heismann in the manner

suggested by the Patent Office. Consequently, it is respectfully submitted that the Patent Office has failed to establish a *prima facie* case of obviousness.

Rather, according to M.P.E.P. § 2142, “[t]o reach a proper determination under 35 U.S.C. 103, . . . impermissible hindsight must be avoided and the legal conclusion [of obviousness] must be reached on the basis of the facts gleaned from the prior art.” Furthermore, according to M.P.E.P. § 2143.01, “[t]he mere fact that references can be . . . modified does not render the resultant combination obvious unless the prior art also suggests the desirability of [such modification].” [*citing* In re Mills, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990)] Since the Patent Office has offered no proper support or motivation for modifying the reference in the manner suggested by the Patent Office, it is respectfully submitted that the rejection based on obviousness is clearly and unequivocally founded upon “knowledge gleaned only from applicant’s disclosure.” [*see* M.P.E.P. § 2145] Consequently, it is respectfully submitted that the rejection wholly and completely entails hindsight and is, therefore, thoroughly improper.

Dependent claims 37-62, 64, 65, 70 and 71 variously depend from claims 36, 63 and 69, and are, therefore, patentably distinguishable over Heismann (as modified by the Patent Office) for at least those reasons stated above with regard to claims 36, 63 and 69.

For at least the foregoing reasons, therefore, it is respectfully submitted that Heismann (as modified by the Patent Office) does not render the subject matter of claims 36-65 and 69-71 obvious. Accordingly, reconsideration and withdrawal of these grounds of rejection are respectfully requested.

All of the rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance and a notice to that effect is earnestly solicited. Should the Examiner have any questions regarding this response or the application in general, the Examiner is urged to contact the Applicants' attorney, Andrew J. Bateman, by telephone at (202) 625-3547. All correspondence should continue to be directed to the address given below.

Respectfully submitted,
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